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ABSTRACT

A brief summary of research findings which support the hypothesis of scriptal knowledge structures in children and which indicates that children use such structures in ways very similar to those of adults is provided in this paper. Research reveals that when children as young as three are asked to tell what they know about events, they tend to give highly generalized accounts for both familiar and relatively novel events. It is suggested on the basis of such findings that young children's knowledge of event structures is generalized from the outset, rather than being abstracted from the accumulation of specific episodes. Research seems to indicate that although scripts are used more flexibly with age, basic script structure, level of generality and content seem relatively invariant from ages 3 to 8. It is speculated that a major developmental change may be the ability to differentiate between and separately store specific episodes as well as generalized scripts. In general, the evidence suggests that scripts function as a form of cognitive organizer, basic to the formation of more complex schemas and categories. (Author/RH)

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Characteristics of Children's Scripts for Familiar Events

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A three-year-old's knowledge of birthday parties may seem far removed from an adult's conception of how to give a lecture or close a business deal. Yet I believe that there are enough commonalities between the two to warrant talking about the representation of event knowledge in terms that apply to both. Moreover, since three-year-olds are in the process of acquiring and displaying knowledge about the situations they take part in the development of knowledge structures should be particularly visible. If such a thing as basic knowledge structures exists, they too should be apparent in young children. Note that there are two senses of development involved here: the micro-development of a structure over time and the macro-development of the child's cognitive system over longer time periods. In an ideal research world one could infer one type of development from the other. If this is the case, then our developmental research with young children should have special significance for the study of the development of knowledge structures in general.

Moreover, for the purpose of studying the development of knowledge structures, such research at least potentially has enormous advantages. Young children don't know very much about the world yet, and they have a lot to learn, a lot of scripts and schemas to build up. Development, then, takes place constantly and at least theoretically is easy to observe. Based on this assumption, for the past several years I, with the collaboration of students and colleagues, have been studying young children's scripts for familiar events--events such as having lunch or dinner, going to a birthday party, a restaurant, grocery shopping, making cookies. At the outset we simply asked children to tell us "what happens" when you engage in these events, i.e. what happens when you go to a birthday party? More recently, we have used more structured techniques, such as story recall, picture choice and story telling tasks. Most of our research is done with preschool children, that is, children between 3 and 5 years, although in some studies we have used children in the early school years as well. Rather than describing one or two studies in detail, I will present here what I consider to be our major findings and the evidence for them.

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We have attempted to go beyond evidence that children have script-like knowledge structures to ask the next questions: are these structures verbalizable? Are they available for use in planning and problem solving? How are they built up? What is their utility in the child's memory processing? How do they change?

Although most of our work thus far has involved verbalization of script knowledge, we do not consider that the verbalization reflects all that the child knows about a script nor does it indicate that script knowledge is itself verbal. It is, however, convenient and also somewhat surprising that even very young children find it natural to talk about their event knowledge, and we assume that what they tell us about it has some significance; that is, that there is a reason for choosing what to say and how to say it. Indeed, our data show that this assumption is correct.

Do children have scripts? To answer this question one needs to ask what the alternative is--what else could they have? For example, they might have stimulus-response chains, where one action leads to another, but there is no overall organizing structure. This has been a common view of young children's minds over the years. According to this model, if you started a child reporting on dinner at eating dessert, say, they should have difficulty in reversing to the prior act of cooking dinner or leaping forward to the much later act of going to bed. On the other hand, they might have stored quite unordered bits and pieces of knowledge in a domain--for example, they might know that they had chocolate ice cream and played pin the tail on the donkey at a birthday party they attended, but not know what the general structure of a birthday party is. This is another very common view of the young child's mind. Or they might have ordered knowledge that is organized according to different principles--association structures specifying what goes with what, for example, so that if you asked about getting dressed they might tell you about all the different kinds of shirts or pants or dresses they had. Or if similarity was the operating principle you might get things that looked like each other. Another possibility is memory for a particular episode or a collection of episodes that is organized but quite specific in its details. If macro development follows Abelson's model of micro development, the latter is presumably what one would expect. Now these last types of organization are certainly not mutually exclusive with the generalized script structure. I would certainly not claim that the human mind--even the young human mind--is confined to one kind of organizing principle. However, what is important about young children is that in previous reserach it has been hard to find any organization beyond the organization provided by the immediate perceptual context. It has been concluded that young children are conceptually inept--not only pre-school but pre-conceptual, pre-logical, pre-operational, even pre-verbal.

Considering the alternatives to scripts, both organized and not, the evidence is very strong that children do have generalized scripts, that is, they organize their knowledge of familiar events according to temporal and causal sequences of acts. Consider the youngest child (aged just 3 years) that we have interviewed within the frame of asking "What happens when you do x?"

Making cookies: "Well, you bake them and eat them."

Birthday party: "You cook a cake and eat it."

Restaurant: "You eat and then you go somewhere."

Grocery Shopping: "You buy things and then you go home."

Getting dressed: "You put on your clothes and then you have breakfast."

Each of this child's answers links two acts basic to the event, including the central or goal act--linked by the temporal linking terms "and" or "and then." In each case the order is correct. Note that there was no intrusion of idiosyncratic or unordered material, or simple episodic reporting, and it is hard to conceive of these responses as s-r chains, since the particular acts that are linked are not necessarily closely linked in time, and they are not elicited by a prior action but by an organizing term or script header: you have a party or go to a restaurant. Moreover, and this is important, they do not refer to elemental actions but whole events: 'You bake them" involves innumerable steps, usually steps carried out by someone else. The child's ability to subsume this activity under a single general term is notable. I might note also at this point that this report is at a very high level of generality altogether--there are no particulars mentioned at all.

Most of our data look equally systematic and general. Different children will mention different acts, but they tell their narratives in veridical sequences, and there is strong agreement among children on the central acts in a given script, as well as the beginning and ending points. This is perhaps more surprising because young children--that is pre-schoolers--inevitably experience activities from a different perspective than our own. Their goals--for going to a restaurant, for example--are often quite different from ours. Indeed, my colleagues report that going to a restaurant seems to be a very boring activity for many young children. Unlike most adults, they have a hard time getting into the spirit of it. But goals are supposed to be what motivates script formation.

How sensitive are children to the goals around which scripts are presumed to be organized? If they don't share our goals, do they have their own? Do goals make a difference to script formation?

In a recent experiment, the data for which are just now being analyzed, we presented children with stories about two events--birthday party and making cookies. In one condition the goal statement was explicitly stated at the outset, while in the other there was no goal statement but a neutral "setting" statement, for example "George and his mother were in the kitchen" rather than "George and his mother decided to make cookies." Children of 3, 4, and 5 years heard brief stories about the events and were asked to retell them both immediately and again later the lapse of a day. There was no difference at either time between the goal and goalless stories in amount of recall, and almost all children were able to state the goal at the conclusion of the story. That is, children inferred the goal from the sequence of events even when it was not stated explicitly. In neither case did the story mention party or cookies in the course of the story itself. On the basis of this experiment then, it appears that our original suspicion that goals were not as apparent to children as to adults was in error, although the fact of no difference in recall may indicate that goals are not so important as script organizers. On the other hand, even if children build their scripts around goals just as adults do, it may still be the case that their goals differ from adults' in particular instances. There is a lot more exploring to be done here. This question has certainly not received a definitive answer as yet.

One of the most striking things about young children's scripts is their generality, as I indicated before. This is evident particularly in the language in which they phrase their reports. They use very general terms such as "you eat" or "you play" rather than "you swing" or "you ride bikes." These specifications leave open many possibilities for inserting variable slot fillers. It is of considerable interest that even the youngest children--3 and 4 year olds--found the "timeless event" present tense form of the verb (that is "eat" instead of "ate") and the general use of "you" and "we" to be natural forms of reporting in this task. These forms have rarely been reported before in ordinary discourse by young children, according to the literature on language development. We believe their use indicates a general level of knowledge that has not been previously tapped.

Another indication of the generality of scripts was found in a study by Kathy McCartney who presented 5 and 7 year old children with script-based stories about dinner and bedtime. The stories were formulated so that half the script for each child was very skeletal and general while the other half contained details. Children at both ages remembered the general script-structure propositions equally well and better than the details (of what was eaten, said, worn), while older children remembered more of the details. The developmental course seemed to be from general to more specific.

Let me try to clarify what I think is the significance of the generality of young children's scripts. It goes against the notion that children are drawing on a store of accumulated episodes that are remembered in some detail and from which a more abstract prototypical structure is eventually derived, although they are already categorical—

general with examples of what can fill slots. Although most of our data is based on scripts that are already highly familiar to children, we have some data for events that are not--for example, day care scripts from children in their first week at the daycare center and firedrill scripts from children who have experienced only one fire drill. We find the same form--general and skeletal--in these as in more familiar events. Thus we believe that the script recall is not being generated from the memory of a single particular experience but from a structure that is generalized, that has open slots for variable roles and objects such as particular teachers, foods and games. It is our strong hypothesis that young children's knowledge of event structures is generalized from the outset; that is, that the first experience of an event leads to an expectation that further experiences of the kind will contain the same basic elements and relationships and an open structure is set up for this purpose.

However, an alternative explanation for the generality of the language used is that children are simply not differentiating between the request for a general account and a more specific memory and use general terms for both. We tested this hypothesis in an experiment in which children were asked to say on one occasion "what happens when you have dinner at home" (or "snack at camp"), the general question, and on another occasion "what happened one time" or "yesterday" (the specific question). To our gratification, there was a clear differentiation between the use of the general present tense for the general account and the past tense for the specific account. Moreover, there was also a greater use of particular terms, that is, slot fillers, in the specific accounts. Surprisingly, the young children found it more difficult to give a specific memory than they did a general account, regardless of order. That is, there were more children who gave no responses and accounts were briefer when the child was asked "what happened at dinner yesterday (or one time)?" than "what happens at dinner" in general. Our tentative explanation for this finding is that the general script actually interferes with the memory of a specific episode; for a routine event like eating dinner, each new episode is absorbed by the script structure. Older children and adults might have developed mechanisms whereby some episodes become tagged as memorable in themselves, in this way developing an autobiographical memory. I should note that Marigold Linton's speculations about autobiographical memories and their fate is consonant with this explanation. We are currently following up these notions with further studies.

What use is a script? Research with adults has found that scripts guide the interpretation of stories and inferences in discourse. They also guide action in familiar situations and structure memory for events.

We have carried out several story recall studies that tend to show similar effects for young children. In the study I mentioned earlier in which preschool children were given stories about birthday party and

making cookies with and without goals, there was also a condition in which the stories violated the canonical temporal order of events. For example the birthday party story would state that children brought presents at the end rather than the beginning. When this happened, children usually either omitted the action that was out of order in their recall, or they repaired it to its correct position in the temporal-causal sequence; or they changed it to fit its place in the sequence, making the presents at the end be party favors that guests took home. These repairs are similar to those observed in recall for stories by older children and adults when a story schema is deformed. However, they indicate the influence of well-structured scripts on memory in children younger than previously observed.

In her dissertation research at Yale, Janice Gruendel studied the development of children's own stories about familiar events in relation to their scripts for those events, and was able to show that the stories constructed by younger children--6-year-olds--were simple transformations of the underlying script and only later--at 8 years or older--did children produce standard story forms that incorporated problem-resolution episodes. The youngest children in her study--4-year-olds--produced simple scripts when asked to tell a story; their scripts did not differ in either length or form from scripts produced by children asked to tell "what happens." We conclude then that scripts not only provide context for young children's stories as they do for adults but that they provide the content and form as well.

In a study still under way we are looking at how the child uses scripts in constructing plans. Here we are examining how preschool children use their knowledge of what happens at a birthday party to guide the purchase of props--food, party hats, etc.--for the party. Clearly in everyday play situations the child's script knowledge is the foundation for much symbolic or pretense play, whether it involves playing house or going to the moon. We are trying to capitalize on this to study the transformations involved and how they are used. In all these ways, then--comprehension, memory, construction of stories and plans--children's scripts have been found to be basic.

How do scripts develop? This question is of central importance not only to this symposium but to our own research. I wish we had a clearer story to tell about it at this time. Initially we expected that we would be able to answer this question by examining the scripts of very young children in terms of their verbalization and acting out roles and comparing them with older children's scripts. To some extent we have been able to do this. We have found across many studies that older children, say 5 or 8 year olds, compared to 3 and 4 year olds, give longer scripts, remember more, use more complex language and report more conditional or alternative paths. For example, when asked to tell about restaurants, they'll say "if we go to McDonald's" or "when we go to Macy's." That is all to be expected on the basis of their greater general cognitive and linguistic maturity. But we have not found that

there is a change in the basic structure of the script, at least from age three to age eight. Three-year-olds, as I indicated before, structure their knowledge using the same generalized temporal-causal sequences that older children do. They leave out more details and their reports are often exceedingly short and skeletal. However, the basics are there. Moreover, in another recent experiment, we gave 3 and 5 year old children the task of choosing pictures appropriate to a particular script from among an array that included irrelevant pictures as well as relevant ones. We found there was no difference between 3 and 5 year olds in either the number or the content of the pictures chosen. Children at both ages included more pictures than they did in their initial verbal reports and produced stories using the pictures that were equally well structured. We therefore believe that even the difference in length of script output may be only an artifact of the production task--younger children apparently know more than we have given them credit for.

We have not yet been able to provide an answer to the question: How does a particular script develop on the basis of a given experience or experiences, and are there developmental--that is, age--differences in the way that it develops? This is a question of some practical as well as theoretical importance, and although I would like to have had the answers for this symposium, these are problems that we are only now beginning to explore in detail. What we can say is that we haven't been able to observe much of significance in macro development--structure, level of generality and even content seem to stay pretty much the same over the years from 3 to 8. The utility of scripts changes as children are able to use them more flexibly as in story telling, but not the basic script itself. Our present guess, as I indicated earlier, is that the major developmental change may involve the ability to differentiate between the general script and specific episodes and to "hang onto" a specific episode in memory as well as the general script. This leads us more and more to the conviction that scripts are a very basic form of cognitive organizer, basic to the formation of more complex and abstract schemas and categories as well as appearing early in development. But what the implication of these findings is for the micro development of scripts at any age remains to be worked out.

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